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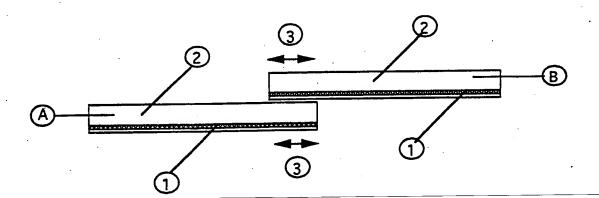
With amended claims.

In English translation (filed in Swedish).

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(74) Agent: BERGGREN, Björn; Långrevsgatan 1, S-723 49 Västerås (SE).

(54) Title: METHOD OF SUPPORTING A ROOF AND THE LIKE



#### (57) Abstract

The present invention relates to a method of adhering, splicing or applying roof, floor or wall material. The method is characterised in that strips, rolls or sheets of or containing metallic layer material (1) are attached to a layer of bitumen, asphalt or tar-like or polymer material (2), or coated or prepared with such material. The strips, rolls, etc. (1-2, 5, 6) of composite material thus produced are placed on a roof or floor, etc. and heated inductively or resistively so that adhesion/splicing is achieved.

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METHOD OF SUPPORTING A ROOF AND THE LIKE.

#### Technical field

The present invention relates to a method of adhering, splicing and/or applying roof, floor or wall material.

#### Background Art

When laying roofing material, the rolled-out material is spliced and/or adhered so that when the overlapping rolls are spliced or adhered they are heated to melting or softening point by means of an open flame, such as from a blow-lamp or an LPG burner, or by means of hot air from a burner where open flames also occur. In all cases there is a considerable risk of fire. The same applies when an older roofing felt is to be covered with new roofing felt or some other similar material.

Similar problems may also arise when applying floor or wall materials where open flames are used either directly or indirectly for the heating process.

## Summary of the Invention

The method according to the invention offers a solution to these and other associated problems and is characterised in that strips, rolls or sheets of or containing metallic layer material 1 such as aluminium (Al), copper (Cu), iron (Fe), brass or the like are attached to a layer of bitumen, asphalt or other tar-like or polymer products, or are coated or prepared with such material, and that rolls of composite material or roofing material are applied side by side and that strips are applied between, under or over the adjacent edges, i.e. a completely metallic layer of the metallic material, or that coated rolls of composite material with such layers are applied mutually overlapping, said strips or overlapping portions being thereafter heated inductively or resistively and adhesion/splicing being achieved.

This method entails considerably less risk of fire and a quick and efficient method of applying roofing material or the equivalent on walls and floors. The metallic strips also provide efficient heating if the heat source is correctly set.

The invention can advantageously be utilized for full adhesion, i.e. the full width of the roll is heated, and previously-laid roofing material can be covered with new material according to the invention, or the invention may be used just for adhesion/splicing.

The inductive or resistive heating can be performed using conventional means that can be rolled or pushed along the joints.

#### **Drawings**

The method according to the invention is exemplified in more detail in the accompanying drawings in which Figure 1 shows overlap application and Figures 2 and 3 application with splicing strips.

# Description of the Drawings

Figure 1, describing full adhesion, shows strips or rolls composed of a metallic layer 1 (Al, Cu, Fe, brass or the like) and a layer 2 of bitumen, asphalt or tar-like or polymer products, arranged to overlap when the roof, wall or floor is applied. The roll length A must be heated first, followed by the roll length B (or vice versa), to softening or melting point so that splicing/adhesion can occur.

The strips or rolls, composed of layers 1 and 2, may also be designed so that the metal layer 1, possibly a foil, is prepared or coated with bitumen, asphalt or the like as above, and heating is performed by the metallic layer 1 being heated when the inductive/resistive heater passes the joint. Figure 2 shows an embodiment with an upper splicing strip 4 between two composite layers 5, 6, and an outer/lower strip 4. Figure 3 shows such a splicing strip 4 placed below (or above) these composite layers. Such splicing strips 4 can also be used in conjunction with conventional roofing material (or the equivalent for floors or walls) and the composite layers (1-2) may also be placed in this way on top of either newly-laid or old roofing material.

The metallic layers 1 may be in the form of foil, unperforated and possibly embossed. Heating is of course performed at the location of the joint. The intermediate layer 4 between two composite layers 5, 6 may possibly be in the form of foil with a thin coating of bitumen, etc.

Frequencies of 4-500 kHz are preferably used for the inductive heater, but both lower and higher frequencies are feasible. The method according to the invention entails a considerably simplified method of laying roofs, etc. as well as a great improvement over methods used hitherto from the environmental aspect.

The invention can be varied in many ways within the scope of the following claims.

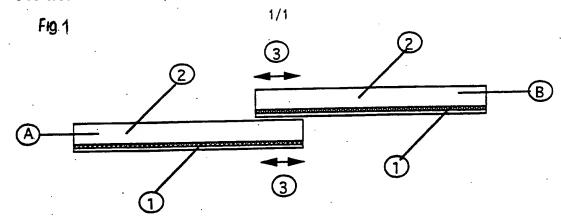
#### Claims:

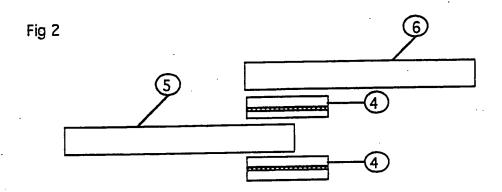
- 1. A method of adhering, splicing or applying roof, floor or wall material, characterised in that strips, rolls or sheets of or containing metallic layer material 1 such as Al, Cu, Fe, brass or the like are attached to a layer of bitumen, asphalt or other tar-like or polymer products, or are coated or prepared with such material, and that rolls of composite material or roofing material are applied side by side and that strips are applied between, under or over the adjacent edges, i.e. a completely metallic layer of the metallic material (4), or that coated rolls of composite material with such layers (1) are applied mutually overlapping, said strips (4) or overlapping portions being thereafter heated inductively or resistively and adhesion/splicing being achieved.
- 2. A method as claimed in claim 1, characterised in that rolled-out layers of composite type are placed on roofing material (or the equivalent for floors and walls) of conventional type, newly applied or old, and heat thereafter applied thereby permanently adhering the new material to the layer below.
- 3. A method as claimed in claim 1 or 2, characterised in that the metallic material is applied in the form of foil, unperforated and possibly embossed.
- 4. A method as claimed in any of the preceding claims, **characterised** in that heating is performed using one or more heaters, inductive or resistive, that are rolled or moved in some other manner along the future joints.
- 5. A method as claimed in claim 3, **characterised** in that the metallic material in the form of foil, unperforated and possibly embossed, is applied adjacent to strips, rolls, etc. of or containing bitumen, asphalt or other tar-like or polymer products.

#### 4 AMENDED CLAIMS

[received by the International Bureau on 16 March 1993 (16.03.93); original claims 1-5 replaced by amended claims 1-5 (1 page)]

- characterised in that strips, rolls or sheets of or containing unperforated metallic layer material 1 such as Al, Cu, Fe, brass or the like are attached to a layer of bitumen, asphalt or other tar-like or polymer products, or are coated or prepared with such unperforated material, and that rolls of composite material or roofing material are applied side by side and that strips are applied between, under or over the adjacent edges, i.e. a completely metallic, unperforated layer of the metallic material (4), or that coated rolls of composite material with such layers (1) are applied mutually overlapping, said strips (4) or overlapping portions being thereafter heated inductively or resistively and adhesion/splicing being achieved.
- 2. A method as claimed in claim 1, characterised in that rolled-out layers of composite type are placed on roofing material (or the equivalent for floors and walls) of conventional type, newly applied or old, and heat thereafter applied thereby permanently adhering the new material to the layer below.
- 3. A method as claimed in claim 1 or 2, characterised in that the metallic material is applied in the form of foil, unperforated and possibly embossed.
- 4. A method as claimed in any of the preceding claims, characterised in that heating is performed using one or more heaters, inductive or resistive, that are rolled or moved in some other manner along the future joints.
- 5. A method as claimed in claim 3, characterised in that the metallic material in the form of foil, unperforated and possibly embossed, is applied adjacent to strips, rolls, etc. of or containing bitumen, asphalt or other tar-like or polymer products.







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### INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 92/00756

Processing to International Present Classification (IPC) or to both National Classification and IPC   Processing to the Processing to th	I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all)					
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"A" document defining the general state of the art which is not considered to be of particular relevance.  "E" earlier document but published on or after the international filling data  "L" document which may throw doubts on priority claim(s) or which is clied to establish the publication date of another claimon or other special reason (as a specified)  "O" document referring to an oral disclosure, use, exhibition or other means  "P" document published prior to the international filing date but ister than the priority date claimed  W. CERTIFICATION  Data of Mailing of this international Search  1st February 1993  Data of Mailing of this international Search  SWEDISH PATENT OFFICE  Vilho Juvonen		•				
"E" sarrier document but published on or after the international filling date  "L" document which may throw doubts an priority claim(s) or which is cited to establish the publication date of another clistion or other special reason (as specified)  "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but istar than the priority date claimed  "V. CERTIFICATION  Date of the Actual Completion of the International Search  International earching Authority  SWEDISH PATENT OFFICE  International international of particular relevance, the claimed invention cannot be considered novel or cannot be considered novel			To tater document published after	the international Tiling date		
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filling date but istar than the priority date claimed  W. CERTIFICATION  Date of the Actual Completion of the International Search  1st February 1993  O5 -02- 1993  International earching Authority  SWEDISH PATENT OFFICE  Vilho Juvonen	"A" document defining the general state of the art which is not clied to understand the principle or theory underlying the invention					
"Is document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but star than the priority date claimed  IV. CERTIFICATION  Date of the Actual Completion of the International Search  Ist February 1993  International earching Authority  SWEDISH PATENT OFFICE  International complete the service of Authorized of the Juvonen  SWEDISH PATENT OFFICE  International complete the service of Authorized of the Juvonen	"E" earlier docum liting date	ent but published on or after the international	"X" document of particular relevant	ce, the claimed invention		
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The document published prior to the international filing data but ister than the priority date claimed  W. CERTIFICATION  Data of the Actual Completion of the International Search  1st February 1993  Data of Mailing of this International Search Report  05 -02- 1993  International earching Authority  SWEDISH PATENT OFFICE  Vilho Juvonen	which is creat to establish the publication date or another cliation or other special reason (as specified)  Ye document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the					
### document published prior to the International filling data but later than the priority data claimed  ### document member of the same patent family  ###################################	"O" document referring to an oral disclosura, usa, exhibition or other means obvious to a person skilled in the art.					
IV. CERTIFICATION  Data of the Actual Completion of the International Search  1st February 1993  International earching Authority  SWEDISH PATENT OFFICE  Data of Mailing of this International Search Report  05 -02-1993  Signature of Authorized Ticer  Vilho Juvonen						
1st February 1993  International earching Authority  SWEDISH PATENT OFFICE  Vilho Juvonen	IV. CERTIFICATION					
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		CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
DOCU	MENTS	CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)  Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No	
	SE,	A, 9002947 (AKE RAMSTRÖM SERVICE KONSULT AB) 18 March 1992, see page 3, line 10 - line 14; figure 2		
`	CA,	A, 1235872 (BUTTS, E. ET AL) 3 May 1988, see figure 3, detail 10		
	US,	A, 4141187 (R.J. GRAVES) 27 February 1979, see figures 4 and 5, detail 22		
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# ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 92/00756

This annex lists the patent family members relating to the patent documents cited in the shove-mentioned international search report. The members are as contained in the Swedish Patent Office EDP fits on 08/01/93. The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of Information.

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP-A2-	0314548	89-05-10	FR-A-B-	2622144	89-04-28
SE	117696	46-11-26	NONE		
FR-A1-	2490057	82-03-12	NONE		
GB-A-	1573163	80-08-13	BE-A- CA-A- CH-A- DE-A- FR-A-B- LU-A- NL-A- US-A-	853727 1110961 622279 2651756 2348957 77163 7704386 4123305	77-08-16 81-10-20 81-03-31 77-11-03 77-11-18 77-08-12 77-10-25 78-10-31
SE-A-	9002947	92-03-18	NONE		·
CA-A-	1235872	88-05-03	EP-A- JP-A-	0278768 1210330	88-08-17 89-08-23
US-A-	4141187	79-02-27	CA-A-	1074076	80-03-25